PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Artcle 36 and Rule 70)

Applicant's or agent's file reference PCA40636/SCP	**FOR FURTHER ACTION**	See Form PCT/IPEA/416
International application No. PCT/KR2004/002037	International filing date *(day/month/year)* **13 AUGUST 2004 (13.08.2004)**	Priority date *(day/month/year)* 13 AUGUST 2003 (13.08.2003)

International Patent Classification (IPC) or national classification and IPC

IPC7 C09D 5/24

Applicant

LUVANTIX CO., LTD. et al

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ (sent to the applicant and to the International Bureau) a total of 2 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:
   - ☒ Box No. I Basis of the report
   - ☐ Box No. II Priority
   - ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - ☐ Box No. IV Lack of unity of invention
   - ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - ☐ Box No. VI Certain documents cited
   - ☐ Box No. VII Certain defects in the international application
   - ☐ Box No. VIII Certain observations on the international application

Date of submission of the demamd	Date of completion of this report
10 JUNE 2005 (10.06.2005)	09 DECEMBER 2005 (09.12.2005)
Name and mailing address of the IPEA/KR Korean Intellectual Property Office 920 Dunsan-dong, Seo-gu, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer LEE, Sun Kuk Telephone No. 82-42-481-5587

Form PCT/IPEA/409 (cover sheet) (April 2005)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/KR2004/002037

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This report is based on translations from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

   ☐ international search (under Rules 12.3 and 23.1(b))
   ☐ publication of the international application (under Rule 12.4)
   ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this reort as "originally filed" and are not annexed to this report)*:

   ☒ the international application as originally filed/furnished

   ☒ the description:
   pages 1-18 as originally filed/furnished
   pages* _____ received by this Authority on _____
   pages* _____ received by this Authority on _____

   ☒ the claims:
   pages _____ as originally filed/furnished
   pages* _____ as amended (together with any statment) under Article 19
   pages* 19-20 received by this Authority on 10/06/2005
   pages* _____ received by this Authority on _____

   ☐ the drawings:
   pages _____ as originally filed/furnished
   pages* _____ received by this Authority on _____
   pages* _____ received by this Authority on _____

   ☐ the sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

   ☐ the description, pages _____
   ☐ the claims, Nos. _____
   ☐ the drawings, sheets _____
   ☐ the sequence listing *(specify)* : _____
   ☐ any table(s) related to sequence listing *(specify)* : _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

   ☐ the description, pages _____
   ☐ the claims, Nos. _____
   ☐ the drawings, sheets _____
   ☐ the sequence listing *(specify)*: _____
   ☐ any table(s) related to sequence listing *(specify)* : _____

** If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/KR2004/002037

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-8	YES
	Claims		NO
Inventive step (IS)	Claims	1-8	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-8	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

1. Reference is made to the following document:

D1: KR 1999-47851 A
D2: KR 2000-21804 A
D3: KR 2002-74791 A

2. D1-D3 are regarded as being the closest prior art to the present invention. D2-D3 were not cited in the ISR.

3. The present invention relates to a photocurable and antistatic resin composition for coating an optical fiber, comprising (A) a photopolymerizable urethane acrylate oligomer, (B) a reactive monomer having at least one (meth)acrylate or vinyl group, (C) a photoinitiator, and (D) an antistatic agent compatible with the oligomer and the monomer, wherein the photopolymerizable urethane acrylate oligomer (A) is derived from an urethane reaction of a mixture comprising (i) a polyol copolymer mixed with a sorbitan fatty acid ester or polyoxyethylene sorbitan fatty acid ester, (ii) a polyisocyanate, (iii) a hydroxy(meth)acrylate, (iv) an urethane reaction catalyst and (v) a polymerization initiator. The components (A) to (D) of the resin composition are used in amounts of 40 to 70% by weight, 15 to 50% by weight, 0.5 to 10% by weight, and 1 to 30% by weight, respectively, based on the total weight of the composition. Also the above-mentioned antistatic agent is selected from the group consisting of a non-ionic or cationic amine, a polyhydric alcohol fatty acid ester, a fatty amide, an alkyl betain and a mixture thereof.

(Continued on Supplemental Box.)

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of:

Box No. V

4. D1 discloses an antistatic photocurable monomer and a radiation curable resin composition containing the monomer, wherein the resin composition is used for coating various plastics to give an antistatic function to the plastics. More specifically, the antistatic photocurable resin composition comprises a photopolymerizable urethane acrylate oligomer, acrylate monomer(as a antistatic agent) having a quaternary ammonium group, a reactive diluent(monomer) selected from the group consisting of a pentaerythritoltriacrylate(PETA), a polyethyleneglycoldiacrylate(PEGDA), etc., and a photoinitiator selected from the group consisting of a hydroxycyclohexyl phenyl ketone(Irgacure #184), a 2-hydroxy-2-methyl-1-phenyl-propan-1-on(Darocure#1173).

D2 discloses a composition hardened by ultra violet for protecting surface containing the following components of: 40-70 wt% of acrylate-based oligomer hardened by ultra violet, 1-30 wt% of reactive diluent, 0.1-10 wt% of photopolymerization initiator, 0.01-5 wt% of anti-blocking agent and 0.1-5 wt% of charged prevention agent(antistatic agent), wherein the oligomer is fatty group urethane acrylate with 6-functionality, the diluent is mono- or multi-functional acrylate-based monomer, the anti-blocking agent is liquid (meta)acrylated polysiloxanes compound or (meta)acrylated organic-transformed polysiloxanes compound and the charged prevention agent is an crylated ammonium compound.

D3 describes a resin composition for coating optical fiber ribbon, which shows increased tensile and surface-sliding properties, and reduced contraction when cured, and reduced surface friction in lamination of ribbons, as well as minimized optical loss. More-specifically, the resin composition for coating optical fiber ribbon comprises (A) 50-80 wt% of photopolymerizable urethane acrylate oligomer, (B) 15-50 wt% of photopolymerizable monomer, (C) 3-15 wt% of photoinitiator, and (D) 0.1-5 wt% of at least one of silica type or wax type slipping agent and antifoaming agent. The photopolymerizable urethane acrylate oligomer(A) is produced from a composition comprising (i) 5-30 wt% of polyol copolymer, (ii) 20-40 wt% of polyisocyanate, (iii) 20-35 wt% of acrylate alcohol, (iv) 0.01-1 wt% of urethane reactive catalyst, (v) 0.01-1 wt% of polymerization initiator, and (vi) 0.1-5 wt% of at least one additive selected from the group consisting of a slipping agent, an antifoaming agent and an antioxidant.
(Continued on Supplemental Box.)

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:

5. Novelty (N)

None of all the documents disclose the photocurable and antistatic resin composition for coating an optical fiber comprising a photopolymerizable urethane acrylate oligomer derived from an urethane reaction of a polyol copolymer mixed with a sorbitan fatty acid ester or polyoxyethylene sorbitan fatty acid ester according to the present invention claimed in claims 1-8.

Thus, claims 1-8 are novel under PCT Article 33(2).

6. Inventive Step (IS)

As mentioned above, D1-D3 do not individually disclose or teach or fairly suggest all of the features of the present invention claimed in claims 1-8. Furthermore, it is not considered to be obvious to a person skilled in the art to apply the knowledge of these documents, taken individually or in combination, for creating the photocurable and antistatic resin composition comprising a photopolymerizable urethane acrylate oligomer derived from an urethane reaction of a polyol copolymer mixed with a sorbitan fatty acid ester or polyoxyethylene sorbitan fatty acid ester according to the present invention claimed in claims 1-8.

Therefore, the present invention claimed in claims 1-8 is considered to involve an inventive step.(Article 33(3))

7. Industrial Applicability (IA)

The present invention is considered to be industrially applicable.(Article 33(4))

What is claimed is:

1. A photocurable and antistatic resin composition for coating an optical fiber, comprising (A) a photopolymerizable urethane acrylate oligomer, (B) a reactive monomer having at least one (meth)acrylate or vinyl group, (C) a photoinitiator, and (D) an antistatic agent compatible with the oligomer and the monomer, wherein the photopolymerizable urethane acrylate oligomer (A) is derived from an urethane reaction of a mixture comprising (i) a polyol copolymer mixed with a sorbitan fatty acid ester or polyoxyethylene sorbitan fatty acid ester, (ii) a polyisocyanate, (iii) a hydroxy(meth)acrylate, (iv) an urethane reaction catalyst and (v) a polymerization initiator.

2. The resin composition of claim 1, wherein the components (A) to (D) are employed in amounts of 40 to 70 % by weight, 15 to 50 % by weight, 0.5 to 10 % by weight, and 1 to 30 % by weight, respectively, based on the total weight of the composition.

3. The resin composition of claim 1, which further comprises (E) a pigment or dye.

4. The resin composition of claim 3, wherein the pigment or dye is employed in an amount of 1 to 10 % by weight of the total resin composition.

5. The resin composition of claim 1, wherein the components (i) to (v) are employed in amounts of 25 to 50% by weight, 20 to 40 % by weight, 20 to 35 % by weight, 0.01 to 1 % by weight, and 0.01 to 1 % by weight,

respectively, based on the mixture for the urethane reaction.

6. The resin composition of claim 1, wherein the sorbitan fatty acid ester is selected from the group consisting of sorbitan monolaurate, sorbitan monopalmitate, sorbitan monostearate, sorbitan tristearate, sorbitan monooleate, sorbitan sesquioleate, sorbitan trioleate, and a mixture thereof.

7. The resin composition of claim 1, wherein the sorbitan fatty acid ester is employed in an amount of 1 to 5 % by weight of the polyol polymer.

8. The resin composition of claim 1, wherein the antistatic agent is selected from the group consisting of a non-ionic or cationic amine, a polyhydric alcohol fatty acid ester, a fatty amide, an alkyl betain and a mixture thereof.